commerce.wi.gov
Wisconsin
Department of Commerce

Safety & Buildings Division
201 West Washington Avenue
P.O. Box 2658
Madison, WI 53701-2658

Evaluation # 201023-I (Replaces 200432-I)
File # 20109023

Wisconsin
Building Products Evaluation

Material	StoTherm "Classic" Exterior Insulation And Finish System
Manufacturer	STO Corporation 6175 Riverside Drive S.W. Atlanta, GA 30331

SCOPE OF EVALUATION

GENERAL: This report evaluates the use of an exterior insulation system (EIFS) manufactured by STO Corporation. The exterior insulation system was evaluated for conformance with the foam plastic requirements of the codes listed below.

Comm requirements below in accordance with the current **Wisconsin Uniform Dwelling Code for 1- & 2-family dwellings:**

- **Foam Plastic:** The foam plastic insulation board used with STO exterior insulation system (EIFS) was evaluated in accordance with the foam plastic requirements of **ss. Comm 21.11(1)**.

The **IBC** requirements below in accordance with the current **Wisconsin Amended ICC Code:**

- **Foam Plastic:** *The foam plastic insulation board is manufactured by a STO approved manufacturer must be verified and evaluated in accordance with the foam plastic requirements of **s. IBC 2603.1**, **2603.2**, **2603.3**, and **2603.4**.

DESCRIPTION AND USE

STO exterior insulation and finish system is a nonstructural exterior wall insulation and finish system consisting of five components. The system may be applied to vertical substrates of unit masonry, concrete (both precast and poured in place) and exterior grade gypsum sheathing. The five components are described below:

1. **Adhesives**: One of the following adhesives is used to attach the insulation board to the underlying wall surface: STO Dispersion adhesive, a ready-mixed copolymer (latex) adhesive for moisture resistant gypsum sheathing only; or

STO BTS-PLUS, a latex adhesive which is mixed with clean water, or
STO BTS-B, a latex adhesive is mixed with clean water.

2. *__Insulation Board__: STO insulation board is a rigid expanded polystyrene insulation board that has an average density of 1.0 pounds per cubic foot. The board has minimum thickness of 3/4" and a maximum thickness of 4" with overall dimensions of 2 feet by 4 feet. The insulation board is manufactured by a STO approved manufacturer and must be verified to have a flame spread rating of 25 or less and a smoke develop rating of 450 or less according to ASTM E84.
3. **Reinforcing Fabric**: STO reinforcing fiberglass mesh is a balance open weave fiberglass made from twisted multi-end strands that is treated for alkaline resistance and compatibility with STO materials. It is embedded in the wet base coat.
4. **Base Coats**: Any one of the following may be used to embed the reinforcing fabric onto the insulating board:

   STO RFP, a ready-mixed synthetic resin (latex) compound for maximum flexibility; or
   STO BTS-PLUS, copolymer based compound is mixed with clean water; or
   STO BTS-B, a polymer based compound is mixed with clean water.

Note: When STO BTS-PLUS or STO BTS-B is used as a base coat, a STO primer shall be used as an adhesion intermediary between the base coat and the STOLIT Finish.

5. **Finish**: STOLIT Finish is a ready mixed acrylic based (latex) textured wall coating of cure hardening material made with marble particles of a graded size and is available in a variety of textures and colors.

Installation Instructions: The substrates, as listed above, are to have no planer irregularities greater than 1/2". The surface shall be clean, dry, solid, and free of all hot spots, releasing agents and other residue. All material shall be installed by STO trained applicators. Use: STO Disperson Adhesive (flame spread 10, smoke developed 25) (on wood based sheathing) or use 60 pounds of STO BTS-PLUS (one bag) 60 pounds of BTS-B (one bag) (flame spread 0, smoke developed 5) mixed with 7-9 quarts of clean water as an adhesive. Apply dispersion adhesive to expanded polystyrene using 3/16 U Trowel. Mixed STO BTS-PLUS or STO BTS-B is applied to the entire surface of the precut insulation board with a stainless steel notched trowel. The ambient temperature must be 38°F or above during and for 48 hours after application.

Beginning at the base, the board is applied to the wall in horizontal rows with firm pressure to the entire surface to ensure uniform contact and high initial bond. All joints where the board joins other materials or terminates at roof-lines, window jambs, head and sills, etc., must be protected in a manner that will not allow water to penetrate behind the insulation board.

A base coat of RFP (flame spread 5, smoke developed 5) or mixed STO BTS-PLUS or BTS-B is applied using a stainless steel trowel to the entire surface of the insulation board to uniform thickness of approximately 1/16". The fiberglass mesh is then immediately place against the wet ground coat, then trowel from the center to the edges, to imbed into the base coat.

STO Fiberglass Mesh is to be continuous at corners and lapped not less than 2 1/2" at mesh edges. Wrinkles are to be avoided in imbedding the STO Fiberglass Mesh. The finish thickness of the base coat is such that the STO Fiberglass Mesh is fully imbedded and covered. The base coat must be fully dry before finish application.

When STO BTS-PLUS or STO BTS-B is used as ground coat, STO Primer shall then be applied as an adhesive intermediary. Primer may be diluted with no more than 5 percent clean water by weight. Application is done with a roller. STO Primer should be allowed to dry prior to the application of selected STOLIT Finish material.

After the STO Base Coat or STO Primer has fully dried, the factory prepared STOLIT Finish material is thoroughly mixed with a high-speed mixer until a uniform workable consistency is obtained. Small amounts of clean water may be added to aid workability. STO synthetic resin plaster finish is then applied directly to the STO RFP or the STO Primer Coat using a clean stainless steel trowel. A final desired texture is achieved by using a plastic or stainless trowel in a variety of motions. The final thickness shall be no greater than the diameter of the largest aggregate.

TESTS AND RESULTS

The flame spread rating and smoke rating specified in the installation instructions are for individual products tested over 1/4" cement asbestos board by Factory Mutual in accordance with **ASTM E-84-81a** test procedures.

The following results were compiled for the composite STO Finish System (BTS-PLUS Base Coat with imbedded STO Reinforced Fiberglass Mesh, STO Primer and STOLIT k 1.5 Finish) applied to 1/4" cement asbestos board:

Flame Spread rating	15	Smoke Developed rating	20

Tests were conducted by personnel at the Fire Test Laboratory of the University of California at Berkeley in accordance with modified **ASTM E-108** tests developed by them. The purpose of the test method is to provide a relative indication of a fire performance of an exterior wall system when subjected to a fire source such as that which might result in a ventilation- controlled post-flashover fire in a compartment bordering the exterior of the building.

1. The STOLIT Finish Coat did not contribute to significant vertical or horizontal flame spread on the exterior wall.
2. The intact STOLIT Finish Coat and reinforcing ground coat layer was capable of preventing flame intrusion into the wall cavity and this prevent fire involvement of the polystyrene core.
3. The STO Wall system did not produce significant quantities of smoke.
4. The removal of a 4" by 24" section of the finish coat and glass fiber adhesive layer to expose the foam core (Test No. 2) did not adversely affect the fire performance of the STO Wall System.
5. A small amount of cracking and de-lamination of the surface finish was noted during both tests. However, these sites did not extend through the reinforcing ground coat layer.

The STO exterior insulation and finish system, tested according to the modified **ASTM E-108** test procedure, was successful in both limiting vertical and horizontal flame spread and in preventing the polystyrene foam core from becoming involved in fire, and did not produce significant amounts of smoke.

Additional testing was conducted to evaluate weather resistance, freeze/thaw resistance, adhesive tensile bond strength, fiberglass mesh tensile properties, impact resistance, water vapor transmission, water absorption and color fastness.

IDENTIFICATION

The foam plastic panels shall be identified in accordance with **IBC 2603.5.6**.

LIMITATIONS OF APPROVAL

The limitations below are applicable to the **Uniform Dwelling Code for 1 & 2 family dwellings** and the current **Wisconsin Amended ICC 2006 Code:**

- The STO exterior insulation system (EIFS) is a nonstructural exterior wall system.
- The construction documents will contain details of the methods used to maintain the weather tightness of all penetrations, and signed and sealed by a registered professional as described in the codes.
- The above codes require exterior wall coverings to be weather-resistant, resisting both wind and rain. Corrosion-resistant flashing shall be provided at the top and sides of all exterior windows and doors and installed in such a manner as to make the opening leak proof. Flashing shall also be installed at all intersections and under windowsills to prevent water intrusion behind the wall veneer.
- The foam plastic insulation board shall be separated from the building interior by ½-inch gypsum wallboard or an equivalent approved thermal barrier material.
- Cement, sand aggregate, retarders, accelerators, fillers, anti-freeze agents or other additives shall not be added to any STO exterior insulation system (EIFS) products, except as specifically referenced in this evaluation.
- The maximum thickness of foam plastic shall is limited to 4 inches. The minimum thickness shall not be less than 1-inch.

- The system shall be applied to a smooth, flat surface on the exterior side of the exterior walls.
- The EIF System shall be installed in accordance with the manufacturer's installation instructions, and subject to the limitations of this evaluation. The installation instructions shall be available at the job site at all times.

The limitations below are applicable to the current **Wisconsin Amended ICC 2006 Code:**

- **Wind Load:** The STO exterior insulation system (EIFS) shall be in accordance with the wind load requirements of **s. IBC 1609.1**.
- **Weather Protection:** The STO exterior insulation system (EIFS) shall be in accordance with the weathering requirements of **s. IBC 1403.2 Exception 2**.
- **Combustible Exterior Wall Covering:** The STO exterior insulation system (EIFS) shall be in accordance with **s. IBC 1406.2**.

This approval will be valid through December 31, 2015, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Reviewed by: JBS
Approval Date: April 30, 2010 By: _____

James B. Smith, P.E..
Program Manager
Bureau of Program Management